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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.              | CONFIRMATION NO. |
|---|-------------|----------------------|----------------------------------|------------------|
| 10/615,067  | 07/09/2003  | Toshifumi Kojima     | 040894-5940                      | 7994             |
| 9629 7590 01/28/2008<br>MORGAN LEWIS & BOCKIUS LLP<br>1111 PENNSYLVANIA AVENUE NW<br>WASHINGTON, DC 20004 |             |                      | EXAMINER<br>LAM, CATHY FONG FONG |                  |
|   |             |                      | ART UNIT                         | PAPER NUMBER     |
|   |             |                      | 1794                             |                  |
|   |             |                      | MAIL DATE                        | DELIVERY MODE    |
|   |             |                      | 01/28/2008                       | PAPER            |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 10/615,067             | KOJIMA ET AL.       |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | Cathy Lam              | 1794                |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 October 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 5,6 and 11-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5,6 and 11-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 31, 2007 has been entered.

#### ***Claim Rejections - 35 USC § 112***

2. Claim 5 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the plated through-hole has a diameter of greater than 50  $\mu\text{m}$  and less than 200  $\mu\text{m}$ , does not reasonably provide enablement for diameter that is less than 50  $\mu\text{m}$ . The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims. Applicant's disclosure clearly states that the through-holes in which the insulative filling material is filled is required to have a diameter of less than 200  $\mu\text{m}$  but greater than 50  $\mu\text{m}$  (page 11).

#### ***Claim Rejections - 35 USC § 103***

1. Claims 5-6, 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al (US 6916873).

Yamamoto discloses a liquid thermosetting resin composition that is used for filling via holes and/or through holes in printed wiring boards (col 1 L 14-18).

The printed wiring boards comprise insulating layers, via holes and/or through holes, and conductive circuit patterns (col 1 L 39-45). The via holes and/or through holes are formed in the thickness of the insulating layers and plated with copper. The thermosetting resin composition is used to fill the via holes for providing conductive connection between the conductive circuit patterns (col 10 L 55-60 & Figs. 1(a)-1(g)).

The liquid thermosetting resin composition is comprised of (A) an epoxy resin, (B) a curing catalyst, (C) a filler and (D) a coupling agent (col 2 L 63-65 & col 3 L 6-8).

The curing catalyst (B) can be dicyandiamide (col 6 L 64 & col 7 L 17-18). The filler (C) are inorganic fillers which can either be conductive or non-conductive particles (col 8 L 10-16). Depending on the type of fillers used, the average filler size is 1-2  $\mu\text{m}$  for spherical fine filler and 4-10  $\mu\text{m}$  for ground filler (col 7 L 64-col 8 L 4).

The coupling agent (D) can be a silane coupling agent which comprises an urea end group (col 9 L 6-11).

The prior art is silent about the dicyandiamide is for reducing deterioration in adhesive strength between the resin composition and the conductor layer. Since Yamamoto teaches the same dicyandiamide as the present invention, inherently Yamamoto's dicyandiamide curing catalyst possesses the same function.

Yamamoto teaches the present invention but is silent about the size of the via hole or through hole, the dicyandiamide is in powder format and the specific type of urea compound used.

Yamamoto's liquid thermosetting resin composition does not cause retention of voids and occurrence of cracks, the examiner takes the position that this refers to a uniform resin composition (col 4 L 51-54).

In view of Yamamoto's teaching, one skill in the art would choose a desired via hole size because choosing a workable size is just a matter of design choice; furthermore, Yamamoto's thermosetting resin composition can certainly be used in a through-hole that is less than 200  $\mu\text{m}$  (or between 50-200  $\mu\text{m}$ ) because the fillers' size are not greater than 10  $\mu\text{m}$ , thus there would be no clogging issue involved.

Regarding top the dicyandiamide curing agent in powders, dendrites or flakes format, since applicant has not stated any advantages of using such, the examiner is taking the position that the prior art (even in different physical format) would perform the same job.

Regarding to the specific type of urea compound, the examiner is taking the position that one skill in the art would choose the claimed urea compounds because finding a workable material involves only routine experimentations.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (571) 272-1538. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on (571) 272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Cathy Lam  
Primary Examiner  
Art Unit 1794

cfl  
January 22, 2008